

THROTTLE DEVICE

CLAIMS

1. Throttle device (1) with a device housing (15) comprising an inlet (2) and an outlet (3) and with a throttle element (5) arranged in a connecting duct (4) connecting the inlet (2) and the outlet (3), said throttle element comprising at least two throttle components (6, 7) to be adjusted relative to one another and by the relative position of which an opening surface of the throttle element (5) is determined, at least the first throttle component (6) being actively connected with a drive means (8) for an adjustment relative to the second throttle component (7), **characterized in that** the throttle components (6, 7) are throttling discs (9, 10) to be rotated relative to one another, at least one of which being movably connected with a rotary adjustment device (11) of the drive means (8), each of the throttling discs (9, 10) comprising at least one throttle opening (12, 13, 40, 41) the overlap of which determines the opening surface depending on the relative position of the throttling discs (9, 10).
2. Throttle device according to claim 1, **characterized in that** the first throttling disc (9) is fixed relative to the device housing (15).
3. Throttle device according to claim 1 or 2, **characterized in that** the first throttling disc (9) forms a part of the connecting duct (4) with at least one throttle opening (12, 40).
4. Throttle device according to one of the preceding claims, **characterized in that** a fixation disc (14) is in particular detachably inserted into the device housing (15) adjacent to the outlet (3), the first throttling disc (9) being stationarily fixed to the fixation disc (14).
5. Throttle device according to one of the preceding claims, **characterized in that** the fixation disc (14) comprises an essentially centric hole (16) forming

a part of the connecting duct (4).

6. Throttle device according to one of the preceding claims, **characterized in that** the hole (16) is expanded towards the outlet (3).
7. Throttle device according to one of the preceding claims, **characterized in that** the second rotating throttling disc (10) is arranged directly adjacent to the first throttling disc (9) and is a part of the connecting duct (4) with at least one throttle opening (13, 41).
8. Throttle device according to one of the preceding claims, **characterized in that** the rotary adjustment device (11) is movably connected with the second throttling disc (10) via a connecting sleeve (17) as operating element (18) of the throttle element (5) forming a part of the connecting duct (4) and being inserted in the device housing (15).
9. Throttle device according to one of the preceding claims, **characterized in that** the inlet (2) is formed in the area of the connecting sleeve (17).
10. Throttle device according to one of the preceding claims, **characterized in that** the inlet (2) comprises an inlet sleeve (19) projecting into the connecting duct (4) through a guiding slot (20) in the connecting sleeve (17).
11. Throttle device according to one of the preceding claims, **characterized in that** the guiding slot (20) essentially extends over an angle of 180° in the circumferential direction (21) of the connecting sleeve (17).
12. Throttle device according to one of the preceding claims, **characterized in that** the rotary adjustment device (11) is formed by a fixed sleeve (22) fixed relative to the device housing (15) and a rotary sleeve (23) to be rotated relative thereto, the rotary sleeve (23) being movably connected on the one hand with the connecting sleeve (17) and on the other hand with the drive

means (8).

13. Throttle device according to one of the preceding claims, **characterized in that** in each fixed sleeve (22) and rotary sleeve (23) at least one slot (24, 25; 26, 27) is formed, the slots comprising various inclinations in the longitudinal direction (28) of the sleeve and overlapping at least for receiving an insertion element (29), which is movable by the drive means (8).
14. Throttle device according to one of the preceding claims, **characterized in that** the insertion element (29) projects essentially radially to the outside from a rotating spindle (30) or a nut (31) of a screw (32).
15. Throttle device according to one of the preceding claims, **characterized in that** the rotating spindle (30) and nut (31) form a ball screw (32).
16. Throttle device according to one of the preceding claims, **characterized in that** the rotating spindle (30) is mounted in the device housing (15) rotatably, but cannot be axially shifted.
17. Throttle device according to one of the preceding claims, **characterized in that** the ball nut (31) can be moved along the rotating spindle (30) and rotated thereabout.
18. Throttle device according to one of the preceding claims, **characterized in that** two insertion elements (29, 33) project outside from the ball nut (31) essentially opposite to one another and engage in correspondingly arranged slot pairs (24, 25, 26, 27) of rotary sleeve (23) and fixed sleeve (22).
19. Throttle device according to one of the preceding claims, **characterized in that** the insertion element (29, 33) is detachably mounted at the ball nut (31).

20. Throttle device according to one of the preceding claims, **characterized in that** the rotary sleeve (23) is rotatably mounted in the device housing (15) at both its ends (34, 35).
21. Throttle device according to one of the preceding claims, **characterized in that** the rotary sleeve (23) comprises an annular flange (36) radially projecting to the inside at its end (34) facing the operating element (17), one end (37) of the rotating spindle (30) being rotatably mounted in the annular flange.
22. Throttle device according to one of the preceding claims, **characterized in that** each throttling disc (9, 10) is stationarily connected with its respectively associated component (14, 17) in particular by a number of pins (39).
23. Throttle device according to one of the preceding claims, **characterized in that** at least one throttling disc (9, 10) comprises a number of throttle openings (12, 13, 40, 41) arranged in the throttling disc plane.
24. Throttle device according to one of the preceding claims, **characterized in that** the same number and/or the same shape and/or the same size of throttle openings (12, 13, 40, 41) are arranged in the throttling discs (9, 10).
25. Throttle device according to one of the preceding claims, **characterized in that** the throttle opening (12, 13, 40, 41) is formed in a circumferential direction (21) of the throttling disc (9, 10) with a growing opening surface (42).